List of Publications of Smt.S.Savithri, Lecturer in Mathematics, YAGDC for Woman, Chirala.

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OK

Γ-Semigroups in which Primary Γ- Ideals are Prime and Maximal

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Abstract: *In this paper, the terms, Maximal Γ- ideal, Primary Γ-semigroup, prime Γ-ideal and simple Γ-semigroup are introduced. It is proved that if S is a Γ-semigroup containing 0 and identity with the maximal Γ-ideal M. Then every non zero primary Γ-ideal is prime as well as maximal if and only if* $S \setminus M$ *is a 0-simple Γ-semigroup with either 1)* $M = (S \setminus M)\, \Gamma a \Gamma\, (S \setminus M) \cup \{0\}$, $a \in M$ *and* $\langle a \rangle \Gamma \langle a \rangle = 0$ *or 2) M is a 0-simple Γ-semigroup. Also it is proved that if S is a duo Γ-semigroup containing 0 and identity with the maximal Γ-ideal M. Then every non zero primary Γ-ideal is prime as well as maximal if and only if S is one of the following types 1)* $S = G \cup M$ *where G is the Γ-group of units and* $M = \{a\gamma g : g \in G,\ a\gamma a = 0,\ a \in M,\ \gamma \in \Gamma\} \cup \{0\}$. *2) S is the union of two Γ-semigroups with 0-adjoined. Also it is proved that if S is a commutative Γ-semigroup with 0 and identity and with the maximal Γ-ideal M. Suppose that every non zero primary Γ-ideal is prime or every nonzero Γ-ideal is prime. Then S satisfies either one of the following conditions 1)* $S = G \cup M$, *where G is the Γ-group of units in S and* $M = (a\Gamma G) \cup \{0\}$, $a \in M$ *and* $a\Gamma a = 0$ *2)* $(M\Gamma)^{n-1} M = M$ *for every positive integer n. Furthermore if S has maximum condition on Γ-ideals then for every* $m \in M$, *we have* $m \in M\Gamma e$, *e being a proper idempotent and also proved that if S is a quasi commutative Noertherian Γ-semigroup containing identity. Suppose every primary Γ-ideal in S is prime. Then the following are equivalent 1) S is cancellative. 2) S has no proper Γ-idempotents. 3) S is a Γ-group.*

Mathematical subject classification: ***(2010)*** **:***20M07; 20M11; 20M12.*

Keywords: *Γ-semigroup, Maximal Γ-ideal, primary Γ-semigroup, commutative Γ-semigroup, left (right) identity, identity, Zero element, Prime Γ-ideal simple Γ-semigroup and duo Γ-semigroup.*

1. Introduction

Γ- semigroup was introduced by Sen and Saha [8] as a generalization of semigroup. Anjaneyulu. A [1], [2] and [3] initiated the study of pseudo symmetric ideals, radicals and semi pseudo symmetric ideals in semigroups. Giri and Wazalwar [4] intiated the study of prime radicals in semigroups. Madhusudhana Rao, Anjaneyulu and Gangadhara Rao [5], [6] initiated the study of prime Γ-radicals and primary and semiprimary Γ-ideals in Γ-semigroups. In this paper we characterize the Γ-semigroups containing 0 and identity in which non zero primary Γ-ideals are prime and maximal and also we study the Γ-semigroups in which primary Γ- ideals are prime.

2. Preliminaries

DEFINITION 2.1: Let S and Γ be any two non-empty sets. Then S is said to be a ***Γ-semigroup*** if there exist a mapping from $S \times \Gamma \times S$ to S which maps $(a, \gamma, b) \to a\,\gamma\, b$ satisfying the condition : $(a\alpha b)\beta c = a\alpha(b\beta c)$ for all $a, b, c \in S$ and $\alpha, \beta, \gamma \in \Gamma$.

NOTE 2.2: Let S be a Γ-semigroup. If A and B are two subsets of S, we shall denote the set $\{ a\gamma b : a \in A,\ b \in B \text{ and } \gamma \in \Gamma \}$ by AΓB.

DEFINITION 2.3: A Γ-semigroup S is said to be ***commutative*** **Γ-semigroup** provided $a\gamma b = b\gamma a$ for all $a, b \in S$ and $\gamma \in \Gamma$.

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U-Γ-SEMIGROUPS AND V- Γ-SEMIGROUPS

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ABSTRACT

In this paper, the terms, Maximal Γ-ideal, primary Γ-semigroup, prime Γ-ideal, simple Γ-semigroup, U- Γ-semigroup and V- Γ-semigroup are introduced. It is proved that Γ-semigroup S is a U- Γ-semigroup if either S has a left (right) identity or S is generated by a Γ-idempotent. Also it is proved that a Γ-semigroup S is a U- Γ-semigroup if and only if every proper Γ-ideal is contained in a proper prime Γ-ideal. Also it is proved that if A is a proper Γ-ideal in the finite dimensional U- Γ-semigroup S, then A is contained in maximal Γ-ideal and also it is proved that if S is a globally idempotent Γ-semigroup with maximal Γ-ideals, then either S is aV- Γ-semigroup or S has a unique maximal Γ-ideal which is prime.

Mathematical subject classification (2010): *20M07; 20M11; 20M12.*

Keywords: *Γ-semigroup, Maximal Γ-ideal, primary Γ-semigroup, commutative Γ-semigroup, left (right) identity, identity, Zero element, Prime Γ-ideal, simple Γ-semigroup, U- Γ-semigroup and V- Γ-semigroup.*

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2. PRELIMINARIES

Definition 2.1: Let S and Γ be any two non-empty sets. Then S is said to be a ***Γ-semigroup*** if there exist a mapping from $S \times \Gamma \times S$ to S which maps $(a, \gamma, b) \rightarrow a\,\gamma\, b$ satisfying the condition: $(a\alpha b)\beta c = a\,\alpha(b\beta c)$ for all $a, b, c \in S$ and $\alpha, \beta, \gamma \in \Gamma$.

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Definition 2.3: A Γ-semigroup S is said to be ***commutative*** **Γ-semigroup** provided $a\gamma b = b\gamma a$ for all $a,b \in S$ and $\gamma \in \Gamma$.

Note 2.4: If S is a commutative Γ-semigroup then $a\,\Gamma b = b\,\Gamma a$ for all $a, b \in S$.

Note 2.5: Let S be a Γ-semigroup and $a, b \in S$ and $\alpha \in \Gamma$. Then $a\alpha a\alpha b$ is denoted by $(a\alpha)^2 b$ and consequently $a\,\alpha\, a\,\alpha\, a\,\alpha \ldots (n\ terms) b$ is denoted by $(a\alpha)^n b$.

Definition 2.6: A Γ-semigroup S is said to be ***quasi commutative*** provided for each $a, b \in S$, there exists a natural number n such that $a\gamma b = (b\gamma)^n a\ \forall \gamma \in \Gamma$.

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